

Supplemental Monitoring Well Locations for EP-3

Introduction

The following discussion describes the proposed locations and construction of additional monitoring wells for Evaporation Pond #3 (EP-3). A recommendation for the location of these wells was requested by Tom Wohlford. The additional monitoring wells would expand the monitoring system for EP-3, and could potentially provide additional background alluvial characterization up-gradient of the Large Tailings Pile (LTP).

Discussion and Recommendations

The proposed additional well locations are shown in the attached figure (blue symbols) along with existing alluvial wells DD and DD2. Both well DD and well DD2 provide alluvial monitoring that could potentially reveal impacts by leakage from EP-3. The five proposed monitoring wells include one up-gradient well (DD3), two wells (DD4 and DD5) located to supplement the existing coverage on the south and east sides of EP-3, and two wells (DD6 and DD7) that provide coverage on the southwest side of EP-3 in an area where the alluvium is not likely to be saturated. The general direction of alluvial ground-water flow is from northeast to southwest.

With the exception of well DD3, the proposed wells are located within the interior fence around EP-3 and at a distance of 70 to 90 feet from the toe of the EP-3 outer berm. Although the wells could be located slightly closer to EP-3, this would make them more susceptible to damage during maintenance of the pond berms. Well DD3 is planned to be located just inside the exterior fence surrounding EP-3 and up-gradient of EP-3. The tabulation below presents the proposed completion information for the wells.

Existing Wells

Well Name	State Plane Easting	State Plane Northing	Well Depth (feet)	Casing Size (inch)	Approx. Land Surface Elev. (ft-MSL)	Depth to Base of Alluvium (ft-LSD)	Est. Base of Alluvium Elev. (ft-MSL)	Estimated WLE (ft-MSL)	Perforation Interval (ft-LSD)
DD	488943	1546989	78.5	4	6590	83	6507	6545.1	40 - 80
DD2	489251	1547439	94.3	4	6591	80	6511	6546.9	50 - 90

Proposed Wells

Well Name	Proposed State Plane Easting	Proposed State Plane Northing	Proposed Well Depth (feet)	Proposed Casing Size (inch)	Approx. Land Surface Elev. (ft-MSL)	Estimated Depth to Base of Alluvium (ft-LSD)	Estimated Base of Alluvium Elev. (ft-MSL)	Estimated WLE (ft-MSL)	Proposed Perforation Interval (ft-LSD)
DD3	489590	1548270	70	4.5	6594	69	6525	6548.5	50-70
DD4	489460	1547680	85	4.5	6592	84	6508	6547.5	45-85
DD5	488700	1547010	55	4.5	6588	56	6532	6545	45-55
DD6	488380	1547350	40	4.5	6589	37	6552	?	30-40
DD7	488100	1547630	20	4.5	6589	19	6570	?	10-20

The recommended completion for the wells is similar to that used for numerous alluvial aquifer wells installed near the site over the last three years. The recommended casing is 4.5 inch PVC (SDR-21, Schedule 40 or heavier). Because it is relatively important to detect the base of the alluvium, cuttings samples should be collected, examined, and described on five foot or finer intervals. If the Chinle shale is not encountered with the proposed drilling depth, the drilling should continue for an additional fifteen feet or until the Chinle Shale is detected. Conversely, if the Chinle Shale is encountered at a shallower depth

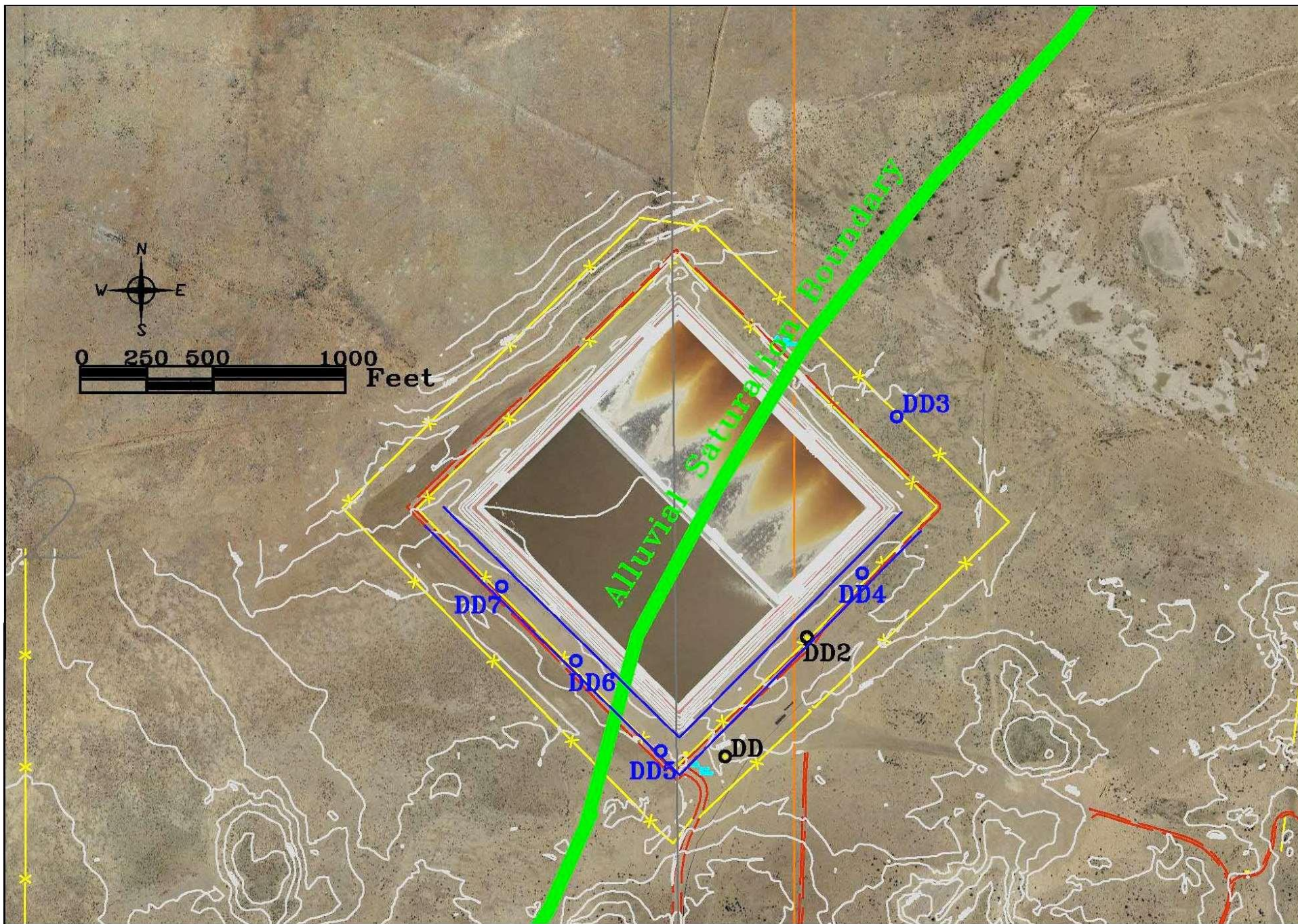
than expected, the drilling should continue only far enough to confirm the contact with the Chinle Shale. If the depth of the drilling to the contact with Chinle Shale (defining the base of alluvium) differs significantly from the tabulation above, the well depths and perforation interval should be shifted up or down to conform with the drilling depths.

The wells should be installed with a sand pack around the perforations and extending to approximately five feet above the top of the perforations. The sand and perforation size for the typical HMC alluvial wells can be used for the proposed wells. A bentonite chip or pellet seal should be used to fill the annulus from the top of the sand to the land surface.

Permitting Considerations

The proposed additional well locations are outside of the area covered by the New Mexico Office of the State Engineer (OSE) permit file numbers 1605 and B-28. Two potential options for permitting of the proposed wells are described below.

- The proposed wells could be permitted as monitoring wells with the OSE. If permitted as monitoring wells, the wells could not be used for injection or collection, but the permitting process is streamlined in that monitoring wells are not subject to protests by other users. This is the recommended approach.
- The active OSE permits allow drilling of numerous collection or injection wells in the On-Site area and there are still some permitted wells available under the existing permits. A request could be made to the OSE to shift the location of five wells under the existing permit to the EP-3 area. One advantage to this approach is that, if remedial efforts are necessary in the EP-3 area, the wells could potentially be used for collection or injection.



EP-3 Monitoring Wells and Proposed Monitoring Wells